

ABSTRACT OF THE DISCLOSURE

Provided are a proton-exchange membrane of which the ionic conductivity is high and the methanol crossover is low, and a fuel cell of high power that comprises the proton-exchange
5 membrane. The proton-exchange membrane has a structure of mesogen-containing organic molecular chains and a proton-donating group-containing group covalent-bonding to a silicon-oxygen three-dimensional crosslinked matrix, in which
10 at least a part of the organic molecular chains are oriented to form an aggregate thereof; and the fuel cell comprises the membrane.